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Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):
Jessen, F., Causey, D. R., Macqueen, D. J., & Devlin, R. H. (2015). *Growth hormone transgenesis influences muscle proteome of Coho salmon (Oncorhynchus kisutch)*. Poster session presented at 5th Trans-Atlantic Fisheries Technology conference (45th WEFTA meeting), Nantes, France.

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Growth hormone transgenesis influences muscle proteome of Coho salmon (*Oncorhynchus kisutch*)

Background

Growth hormone (GH) transgenesis (GHT) leads to increased growth, feed intake and metabolic rate in fish. The molecular pathways involved include energy metabolism, protein synthesis, stress and immune function [1].

Molecular studies of GHT have focussed on the mRNA level but impacts at the more functional level of the proteome remain unknown. This is important due to the potential non-linearity between protein expression and processes governing mRNA production, stability and translation.

[1] Devlin et al. PNAS 2009, 106, 3047–3052

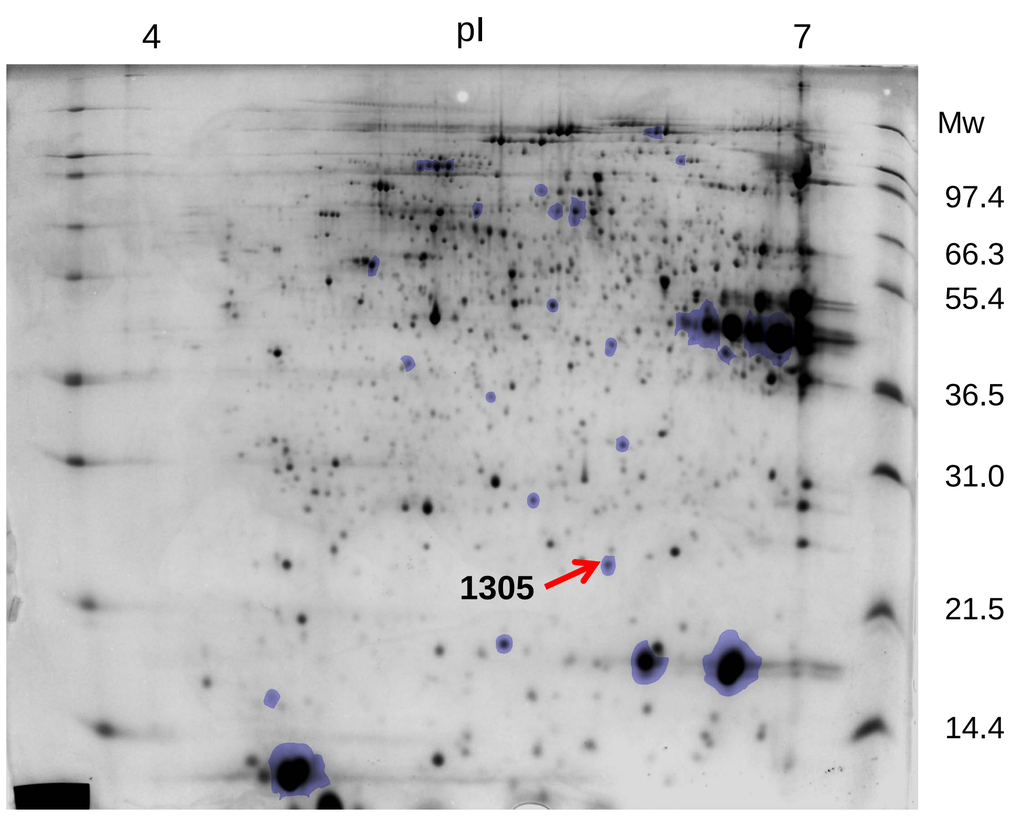
Aim & Approach

To investigate the impact of GH transgenesis on the skeletal muscle proteome of Coho salmon.

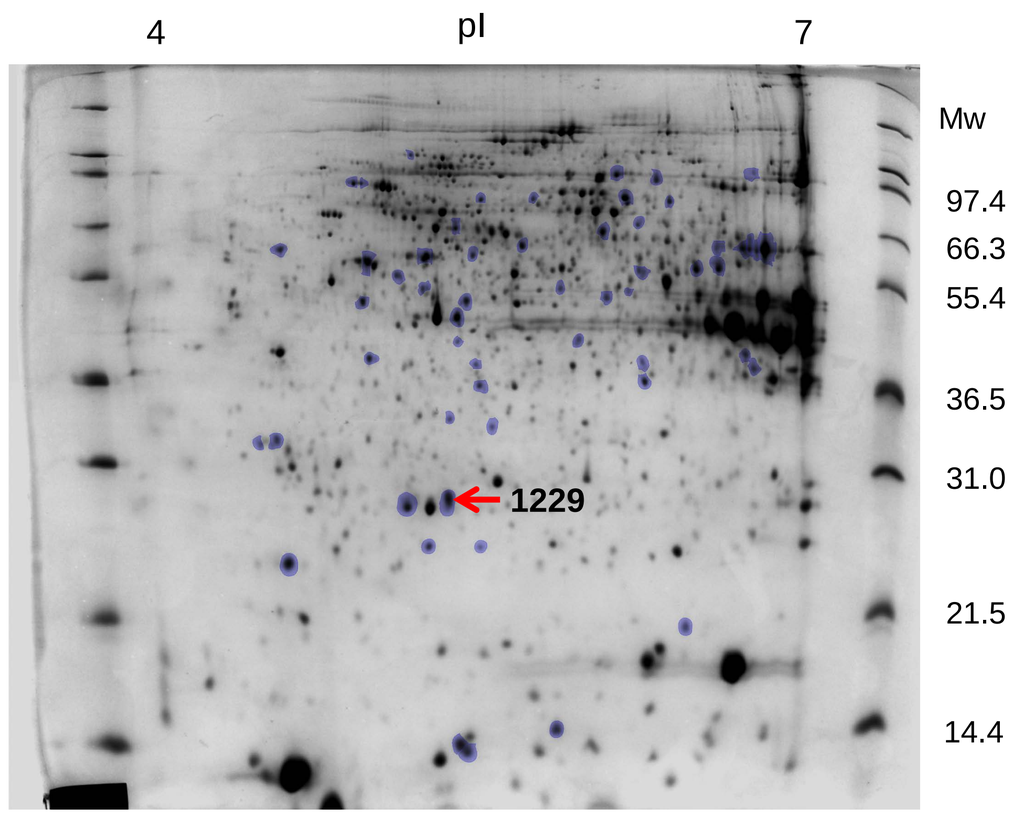
Samples from size-matched wild (n=8) and GHT Coho salmon (n=8) were analysed by two-dimensional gel electrophoresis. Fixed gels were stained with colloidal Coomassie Brilliant blue, digitized (CCD camera), and subjected to image analysis (Progenesis SameSpots).

Results

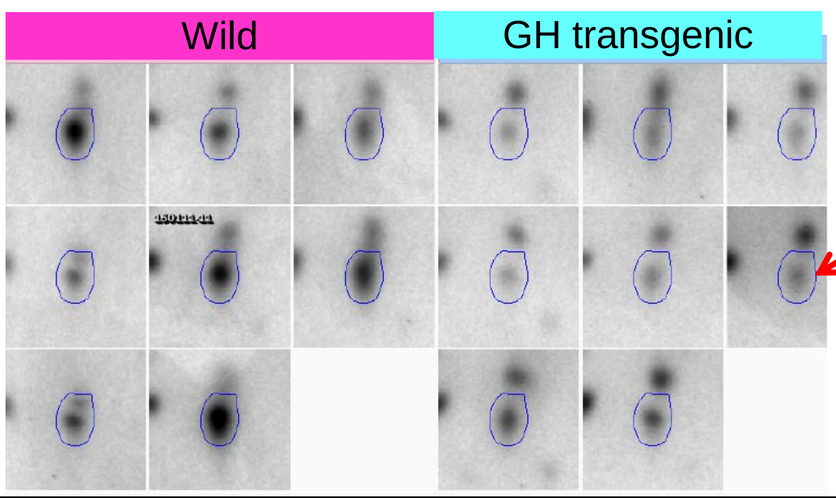
730 protein spots quantitatively comparable between analysed gels. 86 spots differed (p<0.01) in spot volume comparing wild vs. GHT Coho salmon. A low false discovery rate (q=0.037) indicates <4 spots to be false positives.



Downregulated proteins.
The 30 highlighted spots (blue) are downregulated in GHT animals
The gel represents a wild fish.



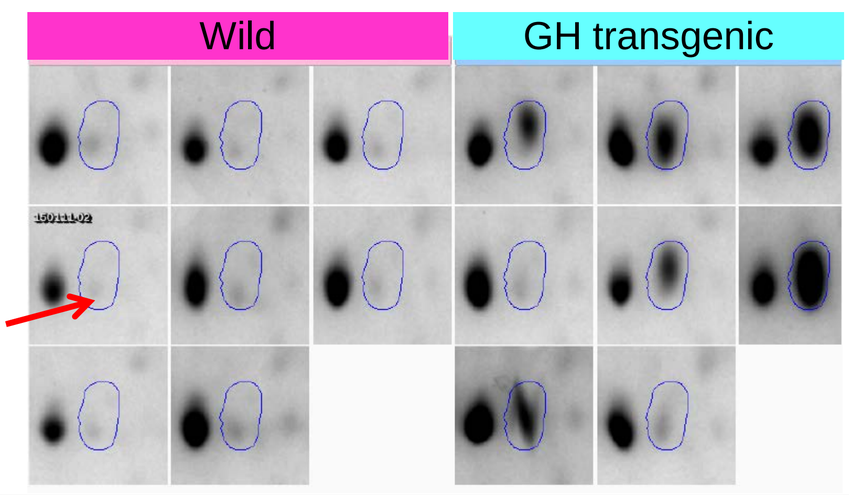
Upregulated proteins.
The 56 highlighted spots (blue) are upregulated in GHT fish
The gel represents a GHT fish.



E.g. data from all 16 fish:

A GHT downregulated spot (1305).

A GHT upregulated spot (1229)



Conclusion: GHT caused marked changes in the skeletal muscle proteome

5th Trans-Atlantic Fisheries Technology conference, Nantes 2015